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NATURAL DISASTER REDUCTION: HAZARD RESISTANT STRUCTURES

Technical session

Addendum

Reduction of structural vulnerability to natural disasters

Summary of presentation by Professor A.G. Davenport, Faculty of Engineering Science, University of Western Ontario and Chairman. National Committee for the International Decade on Natural Disaster Reduction of Canada

1. Structural failure, and the dislocation and loss of life that results, is a primary cause of the disasters that follow severe windstorms and earthquakes. The structures involved can include homes, hospitals, schools, churches, offices, industrial buildings, communication facilities, bridges, utilities and many others.

2. Broadly speaking, the failures result from deficiencies in design, poor quality in construction and lack of maintenance. These three problems go hand in hand and the prevention of disasters generally requires improvements in all these aspects. Of particular importance is the improvement of the quality of construction. This has not been adequately addressed and is likely to provide a key to reducing vulnerability. The presentation addresses this issue, as well as the need to improve design and ensure proper maintenance.

3. The lack of quality in construction is partly due to the fragmented nature of the industry - true in almost all countries - and the large number of interests involved in the process. These interests include the user or occupier, the owner, the investor, the insurer, the builders, the sub-trades, the materials suppliers, the design professionals, the building officials, the code writers and the inspectors. Each of these interests has a different

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attitude to the achievement of quality in construction; the lack of commitment on the part of some can frustrate the efforts of those that are committed. The ability to achieve quality is a limiting factor in improving the technical aspects of the design. The presentation examines, in the light of experience in very many countries, the potential contribution that each of these groups can make towards improving quality and disaster resistance, and suggests strategies for dealing with the matter.

4. Several vital preventive measures can be taken at the design stage to reduce vulnerability against windstorm and earthquake. They include, first and foremost, the assessment of risk of damage from knowledge of the seismicity and windstorm risk, as well as the magnitude and nature of the loading. The assessment of the extent of the impacted area is also discussed. Improved physical knowledge of the natural hazard phenomena plays a very important role. Techniques for lessening the vulnerability of structures are put forward.

5. The maintenance of structures is another aspect of disaster prevention. Techniques for assessing and upgrading existing strength is an important topic and has recently been studied more systematically.